SCIENTIFIC SERIALS

Annalen der Physik und Chemie, No. 1, 1879.—This begins with a portion of an extended inquiry by Herr F. Kohlrausch into the electric conductivity of aqueous solutions of hydrates and salts of the light metals, as also of sulphate of copper, sulphate of zinc, and nitrate of silver. The paper is in three parts—an experimental, a practical, and a theoretical (the first two in this number). The practical part gives tables for use, and formulæ of conductivity, especially of dilute solutions; specifies bodies which show a maximum of conducting power at a degree of concentration of solution below saturation, indicates liquids which commend themselves as a standard for electric conductivity, &c.—Herr W. Kohlrausch furnishes an experimental determination of the velocities of light in crystals. He employed the new instrument called a total reflectometer, and he comes to the conclusion that Fresnel's theory of double refraction in optically uni- and biaxial crystals gives a form of light wave-surfaces, which, within very small errors of measurement, is in general experimentally confirmed for uniaxial crystals, and for the principal sections of biaxial crystals.—Herr Groshaus contributes some interesting observations on the densities of substances in the gaseous and liquid states, in relation to their chemical composition.—Herr Ritter calculates that the quantity of heat radiated annually from the sun 75,000 years ago must have been about 1 per cent. less than at present (700,000 years ago about 10 per cent. less), a result which is supposed to explain the "glacial period," while the previous tropical climate is accounted for by a less thickness of the solid crust of the earth. He also estimates that each kilogramme of the sun's mass contains on an average about 43,000,000 units of heat.—Herr Wiedemann declines to regard the oxide containing copper separated electrolytically from solutions of acetate of cupric oxide, as a peculiar allotropic modification of copper.—There are also papers on the thermo-electric properties of apatite, brucite, &c. (Hankel), the theory and application of electro-magnetic rotation (Margules), the influence of temperature on galvanic conductivity of liquids (Exner and Goldschmiedt), and two new fluorescent substances (Lommel).

SOCIETIES AND ACADEMIES

LONDON

Royal Society, February 27.—"Studies in Acoustics. I. On the Synthetic Examination of Vowel Sounds." By William Henry Preece and Augustus Stroh.

The authors had studied the formation of vowel-sounds on Helmholtz's theory, and had succeeded in constructing an instrument which reproduced the principal vowels with greater distinctness and accuracy than the phonograph, and which fully confirmed that theory. In the pursuit of this study they constructed a new phonautograph, a machine for drawing harmonic curves either on paper or on smoked glass, compounded of one or many partials varying in phase and amplitude, called a "synthetic curve machine," a new syren, a new musical instrument dependent on the vibration of a diaphragm and several instruments for reproducing vowel-sounds. They had also studied the intensity of sound, and showed experimentally how loudness was dependent on the quantity of air thrown into vibration, and independent of the amplitude of vibration of the sonorous body which remained constant. They also introduced a new stereoscopic slide, which rendered very complicated curves perfectly perspective.

Linnean Society, February 20.—Prof. Allman, F.R.S., president, in the chair.—The Rev. G. Henslow exhibited portions of an elm bough having a pulley centrally imbedded; exteriorly all trace of its presence was obliterated, and the wood-growth indicated thirteen years subsequent to the entrance of the foreign body.—Mr. R. Bowdler Sharpe showed and commented on a series of rare birds. Among those from New Guinea were skins of *Paradisea raggiana*, collected by the Rev. Mr. Lawes; of others obtained in the Fijis by Baron von Hugel were species of the genus *Pinarolestes*, which also inhabit Tutuela, one of the Samoan Islands.—Mr. W. H. Fitch passed round a coloured drawing of a remarkable large crimson-coloured pitcher (twelve inches long by nine in circumference) of *Nepenthes sanguinea*, grown at Bury, by Mr. O. Wrigley.—A paper was read by Dr. H. Trimen, on the genus *Oudneya*, Brown. This is a small cruciferous shrub discovered by Dr. Oudney in the desert between Tripoli and Mourzuk. The genus has been obscure in consequence of Brown's short insufficient diagnosis. This latter Cosson has shown to be a *Moricandia*, hence Brown's genus has been doubtfully referred to the same. Dr. Trimen shows from an examination of Oudney's herbarium in the British Museum, that *Oudneya* is identical with *Henophyton*, Coss., which name will supersede, having the priority of thirty-one years.—The abstract of a communication on some South American genera of plants of uncertain position, by Mr. John Miers, was read by the Secretary. The author refers the *Pleoaginea* of Arruda da Camara, who mentions three species belonging to the Chryobalanaceæ, but of which two only should be retained in that genus, the third belonging to the true *Conepia*, Aublet. Among *Parinarium* the two species described and figured by Aublet alone ought to be retained. Those to be excluded are the two British Guiana species of Bentham, and seven others of Brazilian origin described by Dr. Hooker, and which from their floral structure and development of fruit do not differ from *Licania*. The Malayan species of Blume are now shown to belong to the *Petrocarya*, Jack., while the African species enumerated by De Candolle, together with five others yet undescribed, must be referred to *Griffonia*, Benth. and Hook., a genus notable for the conferrumination of the cotyledon of the embryo. The genus *Minquartia*, Aubl., belongs to the Crescentiaceæ, as does *Senapea*. Bentham's and De Candolle's *Kigelia* are widely different, the *K. africana*, Benth., properly belonging to *Tripinnaria*. The genus *Managa*, Aubl., Mr. Miers avers belongs to the Aurantiaceæ; *Racceria*, Aubl., does not come under Sapindaceæ, as De Candolle supposed, but to the Meliaceæ, and is allied to *Melia* and *Azenderachta*, Juss.—Dr. Maxwell Masters next gave the chief points of a paper on the inflorescence of Crassulaceæ. Though devoted chiefly to this group he discussed the schemes of classification proposed by Roeper, Bravais, and others, as also the emendations of Hofmeister, Sachs, and the modern German school of botanists. He proposed a re-arrangement under the heads of Monopodial, or indefinite; Choripodial, or dichotomous; and Pleiopodal, or definite; the latter comprising the Sympodial varieties. The modifications brought about by suppressions, adhesions, congenital or otherwise, real or apparent, and by displacement of varying kind and degree were alluded to, the general conclusion being that while suppressions and adhesions do occasionally occur, yet that in most instances the phenomena witnessed might easily be explained by displacement of parts, and especially by that process of elongation known as up-lifting. The history of development, as well as the internal structure, he believes are consistent with this latter view, but not, as a rule, with the theory of adhesion.—Messrs. Ed. A. Fitch, Laurence Scott, and Wm. Stone were elected Fellows of the Society.

Chemical Society, February 20.—Dr. Gladstone, president, in the chair.—The following papers were read:—On colouring-matters derived from diazo compounds, by Dr. O. N. Witt. For some time after the introduction of anilin dyes, though magentas, violets, and blues were obtained in profusion, no choice of yellow or green anilin dyes was to be had. A few years back, however, a beautiful yellow dye, chrysoïdin, was described by Hofmann, and since that time numerous patents have been taken out for the manufacture of similar substances. In the present paper the author gives an account of these various substances, which are oxy or amido derivatives of azobenzene, including the different tropæolins.—Investigations into the action of substances in the nascent and occluded conditions; hydrogen, continued by Dr. Gladstone and Mr. Tribe. The authors have investigated the actions of nascent hydrogen obtained by electrolysis and hydrogen occluded in palladium or platinum on nitric and sulphuric acids; they establish a close similarity of character, and therefore of condition between the so-called nascent hydrogen and the hydrogen occluded by metals.—On some methods of vapour density determinations, by Mr. J. T. Brown. The author criticises the methods and formulæ of previous experimenters, and suggests the determination of the vapour tensions of mercury by estimating the vapour tension of a substance over Wood's metal and over mercury at different temperatures.—On the decomposition products of quinine and the allied alkaloids, by Mr. J. J. Dobbie and Dr. W. Ramsay. The authors have oxidised the four principal alkaloids derived from cinchona bark, and find that they all yield, on oxidation, the same acid, tricarbopyridenic acid. They also point out that there is a close relation between the cinchona bark alkaloids and the bases of the pyridin series.

Geological Society, February 5.—Henry Clifton Sorby, F.R.S., president, in the chair.—Arthur Ernest Baldwin, James

Farie, Benjamin Neeve Peach, were elected Fellows of the Society.—The President announced the receipt of a legacy of 1,000*l.* bequeathed to the Society by the late Sydney Ellis, Esq., of The Park, Nottingham.—The following communications were read:—On the occurrence of pebbles with Upper-Ludlow fossils in the lower carboniferous conglomerates of North Wales, by Aubrey Strahan, F.G.S., and Alfred O. Walker, F.L.S. The authors described the mode of occurrence near Abergele of certain lower carboniferous conglomerates, best exposed in Ffernant Dingle, and especially of one containing numerous red and green sandstone pebbles, which inclose fossils of Upper-Ludlow forms, and lying above the so-called "bastard limestone." From the arrangement of the beds the authors believe that they may have been deposited against a bank or sloping surface of Wenlock shale; and they state that the great majority of the pebbles in the conglomerate are quite unlike any rock known in the district, but closely resemble the Upper-Ludlow beds of Kendal and Central Wales. The authors discuss the origin of the pebbles, and suggest "the probable extension of the Ludlow beds under Lancashire as the most likely source from which they can have been derived."—On a new group of pre-Cambrian rocks (the Arvonian) in Pembrokeshire, by Henry Hicks, F.G.S.; with an appendix on their microscopic structure by T. Davies, F.G.S. In some new areas of pre-Cambrian rocks, discovered by the author last summer in Pembrokeshire, some rocks of a character hitherto unrecognised in this country were made out. As they were found to hold there, and subsequently also in other areas, a very definite stratigraphical position, with a vertical thickness of several thousand feet, they have been separated by the author from the other pre-Cambrian groups under the distinctive name of Arvonian. They were also found to occupy an intermediate position between the Dimetian and Pebidian formations, and at all points, so far as could be made out, appeared to be separated from each of those formations by stratigraphical breaks. The new areas where they are chiefly exposed are situated some few miles to the north of Haverfordwest, where they form ridges running in a direction from north-east to south-west. They occupy an average width of about a mile, attain at some points to a height of nearly 600 feet, and together have a length of over nine miles. The rocks are flanked by Pebidian and Cambrian beds along their north-west borders, and on the south-east Silurian rocks have been brought against them by faults. In general appearance, as well as in their more minute lithological characters, they are easily distinguished from any of the rocks hitherto described by the author as characteristic of the Dimetian and Pebidian groups in Pembrokeshire. They are, however, so closely allied to some of the true "hälleflinta" rocks of Sweden, that it seems to the author and Mr. Davies that this is the name that should be applied to them in a petrological sense. The author and Mr. Davies believe the origin of the rock to have been a sedimentary one.—On the pre-Cambrian (Dimetian, Arvonian, and Pebidian) rocks of Caernarvonshire and Anglesey, by Henry Hicks, F.G.S.; with an appendix on their microscopic structure by the Rev. Prof. T. G. Bonney, F.R.S. In this paper the author gave the results of some further researches made in Caernarvonshire and Anglesey since his previous communication to the Society on December 5, 1877. A brief statement of some of the results was read at the last meeting of the British Association in Dublin; but much additional evidence was now brought forward, besides many important facts obtained since by microscopical examination of the rocks.—On the quartz-felsite and associated rocks at the base of the Cambrian series in north-western Caernarvonshire, by the Rev. Prof. T. G. Bonney, F.R.S. The great masses of quartz-felsite (or quartz-porphyry) which occur in the vicinity of Bangor, Caernarvon, and Llyn Padarn, are coloured in the Survey map as intrusive, and in the memoir regarded as most probably the result of an extreme metamorphosis of the lower beds of the Cambrian series. The author showed that these quartz-felsites exhibited, in places, all the characteristics of true igneous rocks.—On the metamorphic series between Twt Hill, Caernarvon, and Port Dinorwic, by the Rev. Prof. T. G. Bonney, F.R.S., and F. T. S. Houghton, B.A. In the Geological Survey map this district is coloured as "intrusive felsite," together with those spoken of in the last paper. It was asserted to be probably metamorphic rock by Prof. Hughes and Dr. Hicks in a communication made to the Society last year, and the first author confirmed that view by microscopic examination of a specimen collected by them. The authors had during the past autumn more minutely examined the district, and found: 1. That the general character of the series was that of a metamorphic one; 2. That the rocks of granitoid aspect were associated with well-marked beds of conglomerate; 3. That this series extended up to a little beyond Port Dinorwic, where the quartz-felsite set in. The paper described the microscopic structure of some of the rocks, and the author expressed the opinion that the more granitoid specimens were probably the results of alterations of felspathic grits.

Physical Society, February 22.—Prof. W. G. Adams, in the chair.—New Members: Rev. Coutts Trotter, Prof. G. D. Living, J. C. Adams, F. W. Paterson.—Dr. C. W. Siemens described his new electric current regulator. A necessary condition of the transmission of power to a distance by electricity along a single conductor and re-distributing it by means of branch circuits to separate electric lamps or motors, is that the current strength in each lamp shall be practically uniform. Otherwise the current flowing in the whole branch varies. Hence the necessity of a regulator to regulate the flow of current so as to keep it uniform, however the resistance of the circuit or the electromotive force of the source may vary. The author believes that by properly arranging a number of dynamo-electric machines, either in series or parallel (for intensity or quantity), at each end of the wire, a vast amount of power may be sent along a small copper conductor successfully, provided the distribution is properly regulated. He has designed a regulator based on the heating of a wire by the passage of a current through it. A fine strip of mild steel $\frac{1}{20}$mm. thick is stretched horizontally between two terminals. An upright spindle is supported by means of an insulating foot, upon the middle of this strip, in such a manner that, as the strip bends or sags by its expansion, the spindle sinks with it. Now this spindle carries at its top a table or plate of metal (or, as the case may be, a set of radial springs), and as the spindle rises or sinks to different heights, this plate or these springs make contact with other springs set radially round; and these contacts take out from or throw in resistance coils into the circuit of the current. The sensitive strip is so thin that it may be regarded as a radiating *surface* merely, and it may be assumed that its temperature, due to heating by the current, balances itself with the radiation instantaneously. After passing through the steel strip, the current flows through the coils thrown into circuit, and, by the arrangement we have described, if the current increase so as to over-heat the strip, the latter sags a little more, the spindle sinks, and the consequence is that one or more of the spring contacts is broken, and one or more coils inserted in circuit. A rise of 1° F. in the temperature of the strip is sufficient to liberate two or three of these coils. The fact that the temperature of the strip varies as the square of the current, favours the sensibility of the apparatus. An older form of this apparatus, having pendulous contacts, was also shown; also a regulator in which the expansion by heating of a sensitive wire caused the resistance of several carbon buttons in contact to vary through the pressure exerted on them by means of a bell-crank lever. Dr. Siemens had not been able to prepare carbons which gave the wide variations of resistance obtained by Mr. Edison. Siemens' regulator can also be used as a current meter by causing the sensitive strip to actuate a lever carrying at its end a pencil writing on a moving paper. Dr. Coffin said that he had thought of a regulator in which the heating of a wire spiral in a gaseous chamber would cause the gas to expand and drive up a mercury column past a series of contacts which would throw resistances in circuit. Dr. Guthrie suspected, from some experiments of his, that the conductivity of conductors was not strictly proportional to their sectional area.—Dr. Schuster then gave the results of some observations of his on the spectrum of lightning. These were made by a spectroscope with two prisms, one for the red and the other for the blue end of the spectrum, which were shifted into the line of sight by a chamber arrangement. Three observations were made: one at Las Animas, one at Manitou, and one at Salt Lake City last year. These showed the three nitrogen lines with three well-defined bands and one doubtful band. The nitrogen lines correspond to the spectrum of air, and the bands appear to Dr. Schuster to agree with the spectrum of the light round the negative pole of the spark in a tube containing oxygen with adulteration of carbonic oxide.—Prof. Ayrton then exhibited an exisothermal model of a cooling globe, the globe in question being a trachyte earth 8,000 miles in diameter. The model gives graphically the temperature of every single part of the earth from the moment when it was at the temperature of molten trachyte down to 800,000,000,000 years afterwards, that is, long after the present era.

Royal Microscopical Society, February 12.—Annual meeting.—H. J. Slack, president, in the chair.—The report of the council was presented and read by the Secretary.—The president read his annual address, in which the oil immersion objectives and the recent discussion on fermentation were referred to.—Dr. L. S. Beale, F.R.S., was elected President.—Herr Petzold's slides of insects, kindly lent by the editor of NATURE, were exhibited, also catoptric immersion illuminator, by Mr. Stephenson, and microscopes by Mr. Crisp.

Boston, U.S.A.

American Academy of Arts and Sciences, February 12.—Hon. Charles Francis Adams in the chair.—Prof. Pickering announced the completion of the observations of the zone assigned to the Harvard College Observatory in the revision of the *Durchmusterung* of Argelander. The observer, Prof. W. A. Rogers, has devoted in this work a large portion of his time for the past eight years. The stars are all included between 49° 50′ and 55° 10′ N., and number over 8,000. The accuracy required has made the work very laborious, the total number of observing hours being greater than was required in the Catalogue of Argelander, containing the approximate places of over 300,000 stars. The deductions are still to be made, and will require some years.—Prof. N. S. Shaler read a paper on the explosion of coal-dust in mines, and suggested that a solution of calcium chloride, which is obtained at no other expense than the cost of preparation from the water of salt works, be driven in the form of spray against the walls of the mine in order to fix the dust in a deliquescent substance upon the walls.—Prof. Asa Gray read a paper on the characters of some new genera and species of plants, chiefly of California and Oregon.—Mr. Thomas P. James made some remarks upon American bryology and some new species of mosses described by himself and Leo Lesquereux.—Mr. N. D. C. Hodges presented a paper on a new absolute galvanometer. The current is measured by its effect in changing the time of vibration of a magnet with its axis parallel to that of the coil. Mr. Hodges also presented a method of determining the reduction-factors of a tangent galvanometer for all deflections when the value for any one is known. By measuring a current by the deflection and then with the same coil and magnet, by the change in time of vibration, the ratio between the reduction-factor of the instrument when the magnet makes any angle with the plane of the coil to its value when the magnet is perpendicular to the coil may be found.

Paris

Academy of Sciences, February 24.—M. Daubrée in the chair.—The following papers were read:—On the induced currents resulting from movement of a bobbin across an electromagnetic system, by M. Du Moncel. *Inter alia*, the direction of induced currents caused by a given movement of a bobbin before a magnetic pole may be diametrically opposite, according as the movement is tangential or normal to the pole, and the magnetic core on which the bobbin glides is in contact with the inducing pole, or distant from it.—Observations on M. Planté's recent work, "Researches on Electricity," by M. Becquerel. These researches relate to secondary currents.—On the hemihedric forms of alums, by M. Lecoq de Boisbaudran.—Resistance to change of state of crystalline faces in presence of their mother-water, by the same. The passage from a state of very slow dissolution to one of very slow growth does not take place suddenly; each face rests intact, while the mother-water varies within certain limits. There is no mobile equilibrium or exchange of molecules between a crystalline face and its mother-water, but merely erosion or continuous deposit, and, between the limits of resistance to change of state, neither erosion nor deposit. The resistance to change of state is modified independently for each system of faces.—Experiments on a modification which has been made in the sluice of Aubois, permitting the suppression of the alternate motion of vessels in the lock, by M. de Caligny.—Reflections on M. de Lesseps' communication regarding contagion of the plague, by M. Bouillaud. Considering the plague contagious, he says the important problem now is to ascertain the nature of the *principle* or *agent* by which it is communicated.—M. de Lesseps presented the reports he had drawn up for the Alexandrian authorities during the plague in Egypt in 1834–35.—M. Stephan was elected Correspondent in the Section of Astronomy, in place of the late M. Hansen, of Gotha.—On latex during the germinative evolution of *Tragopogon porrifolius*, &c. (continued), by M. Faivre.—Observations of eclipses of Jupiter's satellites, made at the observatory of Toulouse in 1878, by M. Baillaud.—Direct photography of solar protuberances without use of the spectroscope, by M. Zenger. He puts on the sensitive plate, before a very short exposure, a solution of pyrogallic acid and citrate of silver, and uses a layer which absorbs all the rays composing the light of the corona and the solar protuberances.—Geometrical laws of deformations produced by a force applied at a point of an indefinite solid, and calculation of the error fallen into, when, according to the principles of classical mechanics, one conceives this point of application displaced by a certain quantity in direction of the force, by M. Boussinesq.—Projection of molecular shadows, by Mr. Crookes.—Action of different coloured lights on a layer of bromide of silver impregnated with different organic colouring matters, by M. Cros.—On plates sensitised with tincture of mallow or black-currant, the direct spectrum of the Drummond lamp is inactive in all the middle green, while the red and violet extremities are very active. With carthamine, again, the middle part is most active. With chlorophyll the action continues throughout the visible spectrum and a little beyond it, presenting several minima and maxima. M. Becquerel pointed out that these researches had been to some extent anticipated.—On the production of crystallised chromate of baryta, by M. Bourgeois. This gives some new results by the method of calcining an alkaline chromate with the chloride of the metal which is desired to enter into the saline combination.—On the composition of beer yeast, by MM. Schutzenberger and Destrem. Yeast contains complex compounds both hydrocarbonised and proteic, formed like glucosides, and easily decomposed by acids and alkalies.—On pyrogenic carburets of American petroleum, by M. Prunier. He has obtained carburets with considerably more carbon than any compounds hitherto known (97 per cent., the highest previously 95 per cent.).—On glycide, by M. Hanriot.—On the generation of aniline-black by chromates in presence of chlorates, by M. Grawitz. He disproves M. Witz's recent assertion against this.—On various selenides of lead and copper from the Cordilleras of the Andes, by M. Pisani.—On the presence of a segmentary organ in endoproct Bryozoa, by M. Joliet.—On the segmentary organs and the genital glands of sedentary polychætous Annelides, by M. Cosmorie.—On the scales of osseous fish, by M. Carlet. He describes the effects of colouring with picro-carminate of ammonia, and of subjecting to polarised light.—On the mode of employment of telephones at the Artillery School of Clermont, by M. de Champvallier. The success realised is attributed to the method of regulating the position of the magnet. The milled button for turning the screw has at its base a pointer (at right angles to the axis) which moves over a circle of copper. The positions of this pointer for distinct transmission one way or the other are noted.

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